

Amendments to Claims

1. (canceled)

2. (canceled)

3. (previously presented) A method of joining dissimilar materials, said method comprising the steps of:

placing a first component against a second component at a predetermined joining location, wherein the first and second components are composed of dissimilar materials;

driving a self-piercing rivet through said first component and into said second component to mechanically attach said first component to said second component at said joining location, the self-piercing rivet comprising a head attached to a hollow cylindrical shank with a tapered end so that the shank penetrates through said first component and into said second component and encloses material of said first component in the hollow of said shank;

passing an electrical current through said self-piercing rivet and said second component at said joining location to fuse material at an interface of at least the shank of said rivet and said second component; and

stopping the flow of electrical current to solidify the fused material and form a welded bond between at least said rivet and said second component.

4. (original) The method as recited in claim 3 comprising passing said electrical current by contacting said rivet with a first electrode and contacting said second component with a second electrode at a second surface opposite said joining location and using said electrodes to pass said current through said rivet and second component.

5. (previously presented) The method as recited in claim 3 comprising engaging said first component at said joining location with an electrode assembly comprising a first electrode and a hollow cylindrical electrode tool, said tool being adapted to encompass said rivet and said first electrode and to exert a clamping force on said first component;

engaging said second component at a second surface with a second electrode adapted to conform to said second surface for clamping and electrical contact; and

using said electrodes to pass said current through said rivet and second component, said current flowing around or through said second component from said second surface to said joining location and said interface.

6. (previously presented) The method as recited in claim 3 comprising engaging said first component at said joining location with an electrode assembly comprising a first electrode and a hollow cylindrical electrode tool, said tool being adapted to encompass said rivet and said first electrode and to exert a clamping force on said first component;

engaging said second component at a second surface with a second electrode adapted to conform to said second surface for clamping and electrical contact;

placing said rivet in said electrode tool and driving said rivet through said first component and into said second component with said first electrode; and

using said electrodes to pass said current through said rivet and said second component.

7. (previously presented) A method of joining a non-ferrous component to a ferrous component, said method comprising the steps of:

pressing said non-ferrous component against one surface of said ferrous component at a predetermined joining location using a first electrode assembly to press against said non-ferrous component and a second electrode against another surface of said ferrous component;

driving a self-piercing ferrous rivet through said non-ferrous component using said first electrode and at least into contact with a wall of said ferrous component at said joining location to mechanically attach said non-ferrous component to said ferrous component, the self-piercing ferrous rivet comprising a head attached to a hollow cylindrical shank with a tapered end so that the shank penetrates through said first component and into said second component and encloses material of said first component in the hollow of said shank; and

passing an electrical current through said electrodes, said ferrous rivet, and said ferrous component at said joining location to fuse at least said ferrous rivet to said ferrous component; and

stopping the flow of electrical current to form a welded bond between at least said rivet and said ferrous component.

8. (previously presented) A method of joining a non-ferrous component to a ferrous component as recited in claim 7 in which the non-ferrous component comprises a metal alloy.

9. (previously presented) A method of joining a non-ferrous component to a ferrous component as recited in claim 7 in which the non-ferrous component comprises a polymer composition.

10. (previously presented) A method of joining a sheet portion of a non-ferrous component to a ferrous tube having a first surface and a second surface opposing the first surface, said method comprising the steps of:

pressing the sheet portion of the non-ferrous component against the first surface of the ferrous tube at a predetermined joining location using a first electrode assembly to press against said non-ferrous component and a second electrode against the second surface of the ferrous tube;

driving a self-piercing ferrous rivet through the sheet portion of the non-ferrous component and at least into contact with the first surface of the ferrous tube at said joining location to mechanically attach said non-ferrous component to said ferrous tube, the self-piercing ferrous rivet comprising a head attached to a hollow cylindrical shank with a tapered end so that the shank penetrates through the sheet portion of the non-ferrous first component and into the ferrous tube and encloses material of the first component in the hollow of the shank; and

passing an electrical current through the electrodes, the ferrous rivet, and the ferrous component at said joining location to fuse at least the ferrous rivet to the ferrous component; and

stopping the flow of electrical current to form a welded bond between at least the rivet and the ferrous component.

11. (previously presented) A method of joining a non-ferrous component to a ferrous tube as recited in claim 10 in which the non-ferrous component comprises a metal alloy.

12. previously presented) A method of joining a non-ferrous component to a ferrous tube as recited in claim 10 in which the non-ferrous component comprises a polymer composition.